REMARKS

The present amendment is in response to the Office Action of April 8, 2004. In view of the foregoing amendments and the comments which follow, favorable reconsideration of the application is respectfully requested.

1. Information disclosure Statement

An information disclosure statement in accordance with Rules 97 - 98 is being submitted substantially contemporaneously. The primary "reference" included in the statement is applicant's co-pending application number 10/424,220. By way of explanation, it has recently come to applicant's attention that, due to the evolution of the claims of this application and those of the co-pending application over time (including continuing applications, etc.), the two applications had come to be claiming overlapping subject matter, in part. In order to remedy this issue, the overlapping claims have been cancelled from this application, inasmuch as co-pending application 10/424,220 has the superior effective filing date.

For sake of expediency, Applicant has cancelled all of original claims 1 - 12, and has replaced the same with a new claim set which focuses primarily on the gain guiding and preferential amplification aspects of the present invention. These features are not the subject of independent claims in the mentioned co-pending application.

Applicants also enclose copies of the prior art references cited in the co-pending application, as well as the relevant file history thereof, and other related art.

2. Prior Art Rejections

In light of the replacement of the original claims, a number of the Examiner's claim rejections are rendered moot. However, Applicants wish to state for the record that the claims have not been cancelled owing to the prior art disclosures or the Examiner's rejections, but *solely* due to overlap in claim coverage with the co-pending application mentioned above. To this end, Applicants reiterate and incorporate herein the arguments of record regarding the cited prior art.

As such, estoppel principles such as those illuminated in *Festo* and its emerging progeny do not apply.

As indicated above, the claim set now before the Examiner focuses largely on the preferential amplification and gain-guiding aspects of the present invention. The Examiner previously rejected similar claims based upon the Lawrence et al. reference. Particularly, the Examiner stated as follows:

> Applicant's argument that this reference fails to provide gain guiding, is in error. The signal of this reference is in a single mode and a single mode of a multi-core fiber is excited. The pump overlays the signal and thus must provide gain guiding. While Applicant's disclosure presents another manner of gain-guiding, this does not negate the mode guiding disclosed by Lawrence et al.

Applicants admittedly do not completely understand this statement; however it is at least apparent from the statement that the Examiner is employing a definition of gain-guiding that is foreign to one of skill in the laser arts. Herein, Applicant's use the term "gain guiding" is in accordance with its art-accepted meaning. See, for example the following definition (of "gain guided laser") taken from the Photonics Dictionary:

> A laser diode in which the beam is confined to the region of the active layer with gain high enough to accomplish such confinement without a built-in refractive index profile. That region generally lies just beneath the contact stripe. (*www.photonics.com/dictionary*)

Although this definition is obviously specific to the semiconductor laser field[1], the meaning in other laser fields is the same; i.e., the achievement of beam confinement via the gain profile, *without the aid of a refractive index profile.*

The importance of this invention to the fiber laser field should be clearly understood. In the fields of fiber optics and fiber lasers, the refractive index difference between the core and the cladding of the fiber is traditionally the mechanism responsible for the internal reflection, or the guiding, of the beam of light. Indeed, the discovery of the ability to make glass fibers with such a refractive index difference was the genesis of the entire fiber optics industry.

The ability to guide light in a fiber laser *without* the necessity of an index difference is a watershed discovery. Essentially, this means that substantially pure single mode light can be effectively guided within a nominally multi-mode fiber, e.g., a fiber whose mode area is much larger than that of a single mode fiber. This, in turn, *inter alia,* means that the conventional power limitations on fiber lasers can be overcome, leading to fiber lasers which can operate in entirely new, higher power regimes with a multitude of industrial applications.

Lawrence et al. clearly does not remotely approach such a teaching. The examiner is correct that this patent mentions exciting the fundamental mode in the multimode core of a waveguide, and to this extent may appear similar to the invention. But with apologies to Yogi Berra, the similarities are different.

Lawrence's teachings are not a departure from the known art. It is simple to excite the fundamental mode in an MM fiber or waveguide. What is not so simple is to actually guide the single mode beam within the MM fiber, without overwhelming mode-coupling into higher modes, and produce essentially single mode output at the delivery end of the MM fiber.

Applicants have achieved this through the mechanism of gain guiding. This mechanism does not exist in Lawrence, or in the Griebner reference to which Lawrence refers, or, indeed, in

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[1] Prior to the work of the present inventors, gain guiding was an unknown phenomenon in fiber lasers. Accordingly, one would not expect to find a definition specific to the fiber laser area.

any of the prior art which the Examiner has employed. Accordingly, the rejections of record are misplaced, and should therefore be withdrawn.

The above arguments are specifically germane to new claims 21-26, each of which include the concept of light guiding via amplifier gain. Claims 13-20 do not specifically claim gain-guiding, but instead focus upon preferential amplification/propagation.

In a sense, preferential amplification may be though of as a genus, of which gain guiding is one subset or species, i.e., the species wherein the gain is sufficiently high to actually guide and confine the propagating light. The onset of preferential amplification occurs at a lower gain level than does the phenomenon of gain guiding.

In a multimode fiber, then, preferential amplification is associated with a non-uniform gain profile/dopant profile, e.g., one in which the higher concentrations of dopants reside within an area which is smaller than the mode area of the fiber. For example, if the dopants are restricted to an area which approximates the single mode-area for the given fiber, the fundamental mode will then be preferentially amplified. At greater gains, the fundamental mode will in fact be guided by the gain profile.

The prior art of record is similarly devoid of these concepts as well. Accordingly, it is believed that claims 13-20 stand patentably distinguished over this prior art.

Entry and consideration of this Amendment are respectfully requested.

Respectfully submitted,

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